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(54) Mobile device for mixing fodder

(57) A mobile device for mixing fodder, in particular cattle fodder, which device includes a mixing chamber (1) containing a vertical mixing element (2), which is capable of rotation about a substantially vertical axis and which is capable of moving the fodder in upward direction, and a horizontal mixing element (7), which is capable of moving the fodder substantially in horizontal direction. The device includes driving means for driving said mixing elements, wherein the mixing chamber (1) comprises a mixing chamber portion (4) positioned before the vertical mixing element (2), seen in the direction of movement of the device, and a mixing chamber portion (5) positioned behind said vertical mixing element (2). A horizontal mixing element (7,8) is present in both mixing chamber portions, which element is capable of moving the fodder towards the vertical mixing element (2).

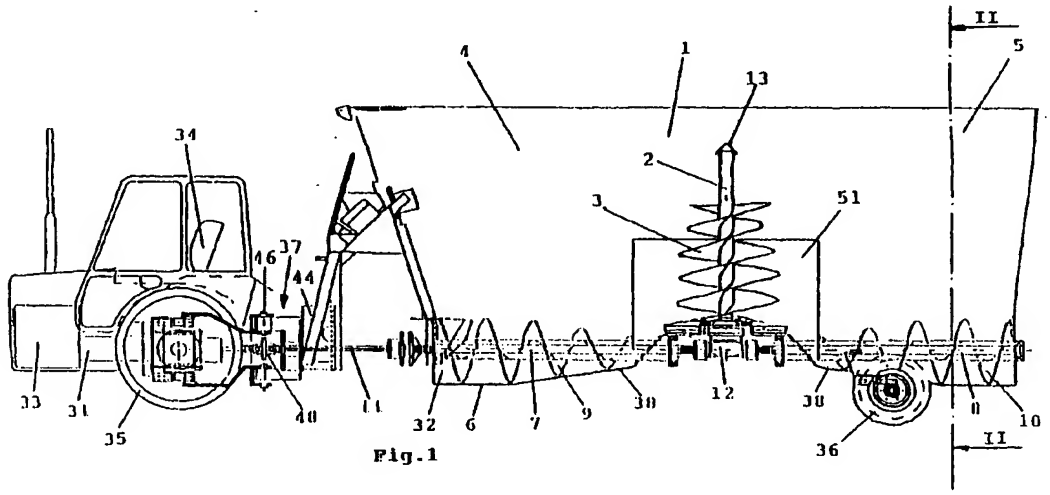

Fig.1

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Description

[0001] The invention relates to a mobile device for mixing fodder, in particular cattle fodder, which device includes a mixing chamber containing a vertical mixing element, which is capable of rotation about a substantially vertical axis and which is capable of moving the fodder in upward direction, and a horizontal mixing element, which is capable of moving the fodder substantially in horizontal direction, and which includes driving means for driving said mixing elements.

[0002] A mobile device for mixing fodder may include a mixing chamber which is open on the upper side, wherein the fodder to be mixed is introduced into the mixing chamber from above by loading means, which may or may not be connected with the device. Furthermore, loading means may be present which introduce the fodder to be mixed into the mixing chamber via an opening in the side wall. Chunks of silage can be introduced into the mixing chamber thereby, which silage is loosened by the mixing elements. In addition, further components can be added to the fodder, which components are mixed with the other fodder components by means of the mixing elements, so that a homogeneous mass is formed.

[0003] A device for mixing fodder of this kind may furthermore include means for delivering the mixed fodder in a measured manner. Said delivery of mixed fodder may take place after the device has been driven to the location where the fodder is to be consumed by the cattle.

[0004] It is desirable for economic reasons to provide the device with a large mixing chamber, preferably so large that the fodder for a large group of cattle can be mixed in one cycle and subsequently be measured out at different locations. A large mixing chamber makes the mixing process more difficult, in the sense that on the one hand the mixing process takes a disproportionately long period of time while on the other hand it requires a disproportionately large amount of power.

[0005] The object of the invention is to provide a mobile device for mixing fodder, wherein the fodder is mixed into a homogeneous mass in an efficient and relatively quick manner.

[0006] According to the invention, in order to accomplish that objective, the mixing chamber comprises a mixing chamber portion positioned before the vertical mixing element, seen in the direction of movement of the device, and a mixing chamber portion positioned behind said vertical mixing element, wherein a horizontal mixing element is present in both mixing chamber portions, which element is capable of moving the fodder towards the vertical mixing element. In practice it has become apparent that in this way an efficient mixing process is obtained, wherein especially the vertical mixing element requires relatively little power, and wherein a proper exchange of fodder being mixed takes place between the two mixing chamber portions.

[0007] Preferably, the dimension of the mixing chamber in the direction of movement is larger, preferably more than two and a half times larger, more preferably more than three times larger, than the dimension of the mixing chamber transversely to the direction of movement. Since the side walls of the mixing chamber slope outwards in upward direction in many cases, the terms width and length of the mixing chamber are to understood to be average values of the width and the length, respectively, of the mixing chamber. This elongated shape of the mixing chamber makes it possible to design a mobile device which, in spite of having a small width, can still have a very large mixing chamber volume.

[0008] Preferably, the vertical rotor includes a helical blade, and in a more preferred embodiment a double helical blade is used, that is, twin helical blades extending within one another, which makes it possible to increase the capacity of the blade. In practice it has moreover become apparent that when fodder is moved up in the direction of the vertical rotor from two sides near the bottom of the mixing chamber, it is possible to use a rotor having a relatively small diameter in order to obtain a satisfactory mixing action. Obviously, the mixing chamber may be fitted with more than one vertical mixing element.

[0009] In one preferred embodiment, a separate helical, horizontal mixing element which is rotatable about a substantially horizontal axis is present in each mixing chamber portion. The two horizontal mixing elements may be positioned in line thereby, and they are preferably mounted on a common rotary shaft. The two mixing elements may have opposite pitch thereby.

[0010] Preferably, the driving means drive one end of a horizontal mixing element, which mixing element is drivably connected at the other end with said vertical mixing element and/or with the other horizontal mixing element. This makes it possible to drive all the mixing elements from the front side of the mixing chamber in an efficient manner.

[0011] Preferably, part of the bottom of the mixing chamber slopes upwards in the direction of the vertical mixing element, so that the fodder being moved by the horizontal mixing elements will already have reached a certain velocity in obliquely upward direction upon reaching the vertical mixing element.

[0012] Preferably, the horizontal mixing element has, at least partially, a decreasing outside diameter, seen in the direction of the vertical mixing element. Said decreasing outside diameter preferably corresponds to an upwardly sloping part of the bottom of the mixing chamber, so that the fodder can be supplied to the vertical mixing element in an efficient manner.

[0013] In another preferred embodiment, the horizontal mixing element comprises a bottom chain fitted with carriers which are moved along the bottom of the mixing chamber. Preferably, said bottom chain is an endless element which is movable essentially in a horizontal plane, to which carriers extending essentially in a hori-

zontal plane are attached, which carriers preferably pivot backwards when said element makes a turn. This will be explained in more detail by means of an embodiment thereof.

[0014] Preferably, a bottom chain is present in each mixing chamber portion and the driving means drive the vertical mixing chamber, and the horizontal mixing elements are drivably connected with the vertical mixing element, so that they are driven via said vertical mixing element. In this manner an effective drive of all mixing elements is achieved.

[0015] Preferably, the device includes a closable outlet for discharging the fodder from the mixing chamber, wherein the horizontal mixing element extends higher than the lowest point of the outlet. If the outlet is present near the place to which the fodder is moved up by a horizontal mixing element, the fodder can be caused to move through the outlet in an effective manner.

[0016] In one preferred embodiment, the device comprises a first vehicle part including a driving motor and a seat for the driver, and a second vehicle part including a loading space, for example in the form of a mixing chamber, which vehicle parts are capable of pivoting movement relative to each other about a substantially vertical axis, which vehicle parts each include two or more wheels, wherein furthermore one vehicle part is capable of pivoting movement relative to the other vehicle part about a substantially horizontal axis, perpendicularly to the wheel axle of the other vehicle part, wherein preferably said other vehicle part comprises said loading space.

[0017] A device of this kind, consisting of two vehicle parts, will be explained in more detail by means of an embodiment thereof, and such a device can be considered to constitute an invention in its own right, detached from the presence of a mixing chamber, whether or not in combination with the other aspects as defined above.

[0018] Preferably, the place where the vehicle parts pivot about said vertical axis is located higher than the place where the vehicle parts are interconnected in such manner as to be capable of pivoting movement about said horizontal axis. The two vehicle parts can be caused to pivot relative to each other about said vertical axis by means of a hydraulic cylinder, and the vehicle can be steered by said pivoting.

[0019] Preferably, a rotary drive shaft is fitted between one vehicle part and the other vehicle part, via which shaft the driving motor, which is present on said one vehicle part, is drivably connected with driven tools present on said other vehicle part, wherein said horizontal axis coincides with the drive shaft at the location where the two vehicle parts are interconnected in such manner as to be capable of pivoting movement about said vertical axis.

[0020] The drive shaft preferably comprises a homokinetic joint, preferably a double universal joint, wherein the centre of the joint essentially lies on the vertical axis. In this manner an efficient power transmission between the two vehicle parts is ensured.

[0021] Preferably, each vehicle part comprises wheels which rotate about a single wheel axle which is fixedly positioned relative to the vehicle part in question. The wheels are not spring-mounted on the vehicle part, therefore, which enables a low construction of said vehicle part, taking up a position quite close to the wheels and/or the wheel axle. In cases wherein a vehicle part includes a mixing chamber for mixing fodder, the bottom of said mixing chamber can be positioned close to the ground, so that a large mixing chamber can be realised. If a vehicle part includes a cabin fitted with a seat for a driver, said cabin may be designed to have a floor which is positioned so low that sufficient legroom is available for the driver's seat and the driver to turn through one hundred and eighty degrees, so that the driver will face ahead both when driving in one direction and when driving in the other direction.

[0022] In one pe, the device includes means for measuring the weight of the second vehicle part, for example in order to determine the weight of the load present on said vehicle part, wherein means are present for measuring the force which the second vehicle part exerts on the wheel axle of said vehicle part, and wherein force measuring connecting elements are provided in an essentially vertical plane through the wheel axle of the first vehicle part. Connecting elements which measure a force in one direction only are used thereby, which enables the connecting elements to measure the vertical force which the part of the device present on one side of said vertical plane exerts on the part of the vehicle that is present on the other side of said plane. When said vertical plane extends through the wheel axle, which wheel axle is connected with one of the two aforesaid parts of the device, it is possible to measure the downward force which the other part of the device exerts at the location of said wheel axle. The torque that the first vehicle part may effect round the wheel axle is left out of consideration thereby, as a result of which the weight of the first vehicle part does not have an influence on said weighing.

[0023] Connecting elements which measure a force in one direction only are commercially available.

[0024] The first vehicle part may comprise two parts, which are interconnected by means of the force measuring connecting elements. Preferably, the one part of the first vehicle part comprises the driving motor, the seat and the wheels of the first vehicle part, and the other part of the first vehicle part comprises a portion of a connecting element by means of which the first vehicle part is connected with the second vehicle part. This will be explained in more detail yet by means of an embodiment.

[0025] In one preferred embodiment, the force measuring connecting elements are mounted both above the wheel axle and under the wheel axle, and that at essentially equal distances from said wheel axle.

[0026] The weight of the load present on the second

vehicle part can be determined by carrying out the above measurement, wherein in fact the torque is measured which the second vehicle part and its load exert on the wheel axle of the second vehicle part. The weight of the load can be derived relatively accurately from said measurement, especially if the wheel axle of the second vehicle part is positioned at the end of said vehicle part remote from the force measuring connecting elements.

[0027] The sum of the force which is measured by the measuring means at the wheel axle of the second vehicle part and the force which the connecting elements measure equals the weight of the second vehicle part including its load, so that the weight of said load can be readily determined.

[0028] The measuring of the weight of the load present on a two-part vehicle in the above-described manner may be considered to constitute a separate invention.

[0029] The invention furthermore relates to a method for mixing fodder in a mobile device, wherein fodder is mixed in a mixing chamber containing a vertical mixing element, which rotates about a substantially vertical axis and moves the fodder in upward direction, and horizontal mixing element, which moves the fodder in substantially horizontal direction, wherein driving means drive said mixing elements, wherein the mixing chamber comprises a mixing chamber portion for the vertical mixing element, seen in the direction of movement of the device, and a mixing chamber portion behind said vertical mixing element, wherein a horizontal mixing element is present in both mixing chamber portions, which element moves the fodder in the direction of said vertical mixing element.

[0030] The invention furthermore relates to a method for steering a mobile device, which device comprises a first vehicle part including a driving motor and a seat for the driver, and a second vehicle part including a loading space, for example in the form of a mixing chamber, wherein the device is steered by causing the two vehicle parts to pivot relative to each other about a substantially vertical axis, wherein said vehicle parts each include two or more wheels, wherein furthermore one vehicle part can pivot relative to the other vehicle part about a substantially horizontal axis, perpendicularly to the wheel axle of the other vehicle part.

[0031] The invention furthermore relates to a method for measuring the load present on a vehicle comprising two wheel axles, wherein a force is measure by means of force measuring connecting elements, which interconnect two parts of the vehicle, which connecting elements are disposed essentially in a vertical plane through one of the wheel axles.

[0032] In order to explain the invention more fully, a few embodiments thereof will now be explained in more detail with reference to the drawing. The figures are merely schematic representations, wherein corresponding parts are indicated by the same numerals.

Figure 1 is a longitudinal sectional view of one embodiment;

Figure 2 is a cross-sectional view along line II-II in Figure 1;

Figure 3 is a plan view of the mixing chamber of said embodiment;

Figure 4 is a longitudinal sectional view of another mixing chamber;

Figure 5 is a plan view of the mixing chamber of Figure 4;

Figures 6 and 7 are perspective views of a connecting element;

Figure 8 is a side view of the connecting element of Figures 6 and 7;

Figure 9 is a sectional view of the connecting element of Figures 6 and 7; and

Figures 10 and 11 shows details of Figure 1, wherein force measuring connecting elements are present.

[0033] Figure 1 is a very schematic longitudinal sectional view of a device consisting of a first vehicle part 31 including a driving motor 33, a seat 34 for the driver of the device and wheels 35, and further of a second vehicle part 32 including a mixing chamber 1 and wheels 36.

[0034] The mixing chamber 1 for mixing fodder and/or other materials includes a vertical mixing element in the form of a rotor 2, which is provided with a helical blade 3. The mixing chamber includes a mixing chamber portion 4, which is disposed before rotor 2, and a mixing chamber portion 5, which is disposed behind rotor 2, assuming that the direction of movement of the device of Figure 1 is to the left. Near bottom 6 of the mixing chamber, a horizontal mixing element in the shape of a rotor 7 is mounted in mixing chamber portion 4 and a rotor 8 is mounted in mixing chamber portion 5. Both rotors 7, 8 include a helical blade 9, 10, so that the fodder which is present in mixing chamber 1 is moved in horizontal direction upon rotation of rotors 7, 8.

[0035] Rotors 7, 2, 8 are driven via a drive shaft 11 on the front side of mixing chamber 1. Drive shaft 11 is connected with the front end of rotor 7, whilst the other end of rotor 7 is connected with a gearbox 12. Rotors 2 and 8 are driven by rotor 7 via gearbox 12.

[0036] The direction of rotation of rotors 2, 7, 8 is such that the two horizontal rotors 7, 8 move the material to be mixed towards rotor 2, whilst rotor 2 moves said material in upward direction. A circulating flow of material is thereby present in the two mixing chamber portions 4, 5, as a result of which a good mixing effect is obtained, whilst an exchange of the material between the two mixing chamber portions 4, 5 is effected at the location of vertical rotor 2.

[0037] The bottom 6 of mixing chamber 1 includes an upwardly sloping part 38 near vertical rotor 2. The diameter of blades 9, 10 of horizontal rotors 7, 8 thereby decreases in the direction of vertical rotor, such that it joins

bottom 6 at all times, also in part 38 of bottom 6.

[0038] A closable outlet 51 is present in the side wall of mixing chamber 1, near vertical rotor 2, which outlet functions to enable delivery of the mixed fodder at the location where it is to be consumed by the cattle.

[0039] Figure 2 is a cross-sectional view of mixing chamber 1, which shows that the mixing chamber, and in particular the bottom part of mixing chamber 1, is wider near vertical rotor 2 than near rotors 7, 8. Present in the wider part is outlet 51 (Figure 1), which is closed by means of a slide 52, which can be moved upward by means of hydraulic cylinder 53 so as to release said outlet.

[0040] The upper side of rotor 2 is bearing-mounted in a cross beam 13, which extends in the transverse direction of mixing chamber 1 and which is mounted near the upper edge of the side wall of the mixing chamber.

[0041] Figure 3 is a smaller-scale, schematic plan view of the mixing chamber according to Figures 1 and 2.

[0042] The vertical rotor 2, which is shown in Figures 1, 2 and 3, includes a double blade 14 consisting of twin helical blades extending within one another. The conveying capacity of such a rotor is larger at a particular rotational speed, twice as large in principle, as a result of which a mixture can be generated more quickly.

[0043] Figures 4 and 5 show an embodiment of a mixing chamber 1 wherein the horizontal mixing elements consist of two bottom chains 16, 17, which move substantially in a horizontal plane near the bottom of mixing chamber 1. Bottom chains 16, 17 move in a clockwise direction, seen in Figure 6. They are fitted with carriers 18, which are pivotally connected with the bottom chain. Carriers 18 are furthermore connected with bottom chain 17, 18 by means of connecting bars 19, so that carriers 18 will slightly retract from the material to be mixed when bottom chain 17, 18 rounds terminal wheel 20, 21.

[0044] It will be apparent that in the embodiment of Figures 4 and 5 the material to be mixed is not only moved in the direction of vertical mixing element 2, but also, on the other side of the mixing chamber, in opposite direction. This is conducive towards a good exchange of the material to be mixed between the two mixing chamber portions 4, 5.

[0045] In the embodiment according to Figures 4 and 5, driving takes place via gearbox 22, which is driven by means of drive shaft 11 and which in turn drives vertical rotor 2. Bottom chains 16, 17 both have a terminal wheel 23, 24 which is mounted on the shaft of rotor 2 and which is thus driven via gearbox 22.

[0046] The two vehicle parts 31, 32 of Figure 1 are interconnected by means of a connecting element 37, as a result of which the two vehicle parts 31, 32 can pivot relative to each other about a vertical axis and about a horizontal axis. In bends, the device can be steered by causing first vehicle part 31 to pivot about said vertical axis relative to second vehicle part 32, to which end a hydraulic cylinder is present between the two vehicle parts 31, 32, which hydraulic cylinder is not shown in the figures.

[0047] Since the two vehicle parts 31, 32 can also pivot relative to each other about a substantially horizontal axis, the wheel axles of wheels 35, 36 may be fixedly mounted in the respective vehicle part 31, 32. This enables a low position of the floor in cabin 38 of first vehicle part 31, so that the seat 34 for the driver can rotate about a vertical axis whilst sufficient legroom is available for the driver. Since driver's seat 34 is rotatable, the position of the seated driver can be adapted to the direction of movement of the device, so that the device can be easily steered both when driving ahead (to the left in the figures) and when reversing (to the right in the figures).

[0048] Figures 6 - 9 show the connecting element 37. Said figures show a connecting element 41 which is provided with holes 42 for attaching mounting element 41 to second vehicle part 32. Mounting element 41 comprises a cylindrical portion 43, which is surrounded by an intermediate element 44 which is pivotally mounted thereon. Intermediate element 44 can be mounted round cylindrical portion 43 in that it is built up of two parts which can be connected together, which is not shown in the figures for that matter.

[0049] Intermediate element 44 is connected with first vehicle part 31, being capable of pivoting movement about a vertical axis, by means of the two mounting elements 45 which are attached to first vehicle part 31. Said pivoting takes place about a vertical pivot pin 46. It will be apparent that mounting element 37 thus enables pivoting movement of the two vehicle parts 31, 32 relative to each other about a vertical axis as well as about a horizontal axis.

[0050] Figures 6 - 9 furthermore show a drive shaft 47, which includes a double universal joint 48. The centre of double universal joint 48 coincides substantially with the central axis of pivot pin 46, so that an optimum transmission of a rotary movement via drive shaft 47 is possible.

[0051] Figures 10 and 11 are larger-scale representations of parts of Figure 1, with reference to which the means for measuring the weight of the second vehicle part 32 will now be explained in more detail.

[0052] Figure 10 shows the intermediate element 44, which is so connected with second vehicle part 32 that it is capable of pivoting movement about a horizontal axis. Intermediate element 44 is pivoted to a portion 54 of first vehicle part 31 via a vertical pivot pin 46, which portion 54 is connected with the other portion of first vehicle part 31 by means of force-measuring connecting elements 55. To that end, the connecting elements 55 are on the one hand attached to portion 54 and on the other hand to attachments 56 forming part of first vehicle part 31.

[0053] Figure 11 schematically shows the wheels 36 of second vehicle part 32, and that at an even larger scale than in Figure 10. Second vehicle part 32 is pro-

vided with attachments 57, in which a force measuring connecting element 58 is mounted, which connecting element 58 is on the other hand attached to wheel axle 59. Connecting element 58 measures the vertical force which the second vehicle part 32 exerts on the wheel axle 59.

[0054] The sum of the vertical forces being measured by connecting elements 55 (Figure 10) and 58 (Figure 11) equals the weight of the second vehicle part 32 including the load present thereon. Since the force measuring connecting elements 55 are disposed in a vertical plane through the axle of wheels 35 of first vehicle part 31, the weight of first vehicle part 31 and the position of the centre of gravity of first vehicle part 31 does not influence the measurement of the weight of second vehicle part 32.

Claims

1. A mobile device for mixing fodder, in particular cattle fodder, which device includes a mixing chamber containing a vertical mixing element, which is capable of rotation about a substantially vertical axis and which is capable of moving the fodder in upward direction, and a horizontal mixing element, which is capable of moving the fodder substantially in horizontal direction, and which includes driving means for driving said mixing elements, wherein the mixing chamber comprises a mixing chamber portion positioned before the vertical mixing element, seen in the direction of movement of the device, and a mixing chamber portion positioned behind said vertical mixing element, wherein a horizontal mixing element is present in both mixing chamber portions, which element is capable of moving the fodder towards the vertical mixing element.

2. A device according to claim 1, characterized in that the dimension of the mixing chamber in the direction of movement is larger, preferably more than two and a half times larger, more preferably more than three times larger, than the dimension of the mixing chamber transversely to the direction of movement.

3. A device according to any one of the preceding claims, characterized in that the vertical rotor includes a helical blade, preferably twin helical blades extending within one another.

4. A device according to any one of the preceding claims, characterized in that part of the bottom of the mixing chamber slopes upwards in the direction of the vertical mixing element.

5. A device according to any one of the preceding claims, characterized in that a separate helical, horizontal mixing element which is rotatable about a substantially horizontal axis is present in each mixing chamber portion.

6. A device according to claim 5, characterized in that the two horizontal mixing elements are positioned substantially in line and in that they preferably have opposite pitch.

7. A device according to claim 5 or 6, characterized in that the driving means drive one end of a horizontal mixing element, which mixing element is drivably connected at the other end with said vertical mixing element and/or with the other horizontal mixing element.

8. A device according to any one of the claims 5 - 7, characterized in that a horizontal mixing element has, at least partially, a decreasing outside diameter, seen in the direction of the vertical mixing element.

9. A device according to any one of the claims 1 - 4, characterized in that the horizontal mixing element comprises a bottom chain fitted with carriers which are moved along the bottom of the mixing chamber.

10. A device according to claim 9, characterized in that said bottom chain is an endless element which is movable essentially in a horizontal plane, to which carriers extending essentially in a horizontal plane are attached, which carriers pivot backwards when said element makes a turn.

11. A device according to claim 9 or 10, characterized in that a bottom chain is present in each mixing chamber portion.

12. A device according to any one of the claims 9 - 11, characterized in that the driving means drive the vertical mixing chamber and the horizontal mixing element is drivably connected to the vertical mixing element.

13. A device according to any one of the preceding claims, characterized by a closable outlet for discharging the fodder from the mixing chamber, wherein the horizontal mixing element extends higher than the lowest point of the outlet.

14. A device according to any one of the preceding claims, characterized in that the device comprises a first vehicle part including a driving motor and a seat for the driver, and a second vehicle part including a loading space, for example in the form of a mixing chamber, which vehicle parts are capable of pivoting movement relative to each other about a substantially vertical axis, which vehicle parts each include two or more wheels, wherein furthermore

one vehicle part is capable of pivoting movement relative to the other vehicle part about a substantially horizontal axis, perpendicularly to the wheel axle of the other vehicle part.

15. A device according to claim 14, characterized in that said other vehicle part comprises said loading space.

16. A device according to claim 14 or 15, characterized in that the place where the vehicle parts pivot about said vertical axis is located higher than the place where the vehicle parts are pivoted together interconnected in such a manner as to be capable of pivoting movement about said horizontal axis.

17. A device according to any one of the claims 14 - 16, characterized in that a rotary drive shaft is fitted between one vehicle part and the other vehicle part, wherein said horizontal axis coincides with the drive shaft at the location where the two vehicle parts are interconnected in such a manner as to be capable of pivoting movement about said horizontal axis.

18. A device according to claim 17, characterized in that the drive shaft comprises double universal joint at the location of said vertical axis.

19. A device according to claim 14 - 18, characterized in that each vehicle part comprises wheels which rotate about a single wheel axle which is fixedly positioned relative to the vehicle part in question.

20. A device according to any one of the claims 14 - 19, characterized by means for measuring the weight of the second vehicle part, for example in order to determine the weight of the load present on said vehicle part, wherein means are present for measuring the force which the second vehicle part exerts on the wheel axle of said vehicle part, and wherein force measuring connecting elements are provided in an essentially vertical plane through the wheel axle of said first vehicle part.

21. A device according to claim 20, characterized in that said first vehicle part comprises two parts, which are interconnected by means of the force measuring connecting elements, wherein the wheel axle is connected with one of said two parts and wherein the other part is connected to the second vehicle part.

22. A device according to claim 21, characterized in that said one part comprises the driving motor, the seat and the wheels of the first vehicle part, and in that said other part comprises a connecting element which is connected with said one part.

23. A method for mixing fodder in a mobile device, wherein fodder is mixed in a mixing chamber containing a vertical mixing element, which rotates about a substantially vertical axis and moves the fodder in upward direction, and horizontal mixing element, which moves the fodder in substantially horizontal direction, wherein driving means drive said mixing elements, wherein the mixing chamber comprises a mixing chamber portion for the vertical mixing element, seen in the direction of movement of the device, and a mixing chamber portion behind said vertical mixing element, wherein a horizontal mixing element is present in both mixing chamber portions, which element moves the fodder in the direction of said vertical mixing element.

24. A method for steering a mobile device, which device comprises a first vehicle part including a driving motor and a seat for the driver, and a second vehicle part including a loading space, for example in the form of a mixing chamber, wherein the device is steered by causing the two vehicle parts to pivot relative to each other about a substantially vertical axis, wherein said vehicle parts each include two or more wheels, wherein furthermore one vehicle part can pivot relative to the other vehicle part about a substantially horizontal axis, perpendicularly to the wheel axle of the other vehicle part.

25. A method for measuring the load present on a vehicle comprising two wheel axles, wherein a force is measure by means of force measuring connecting elements, which interconnect two parts of the vehicle, which connecting elements are disposed essentially in a vertical plane through one of the wheel axles.

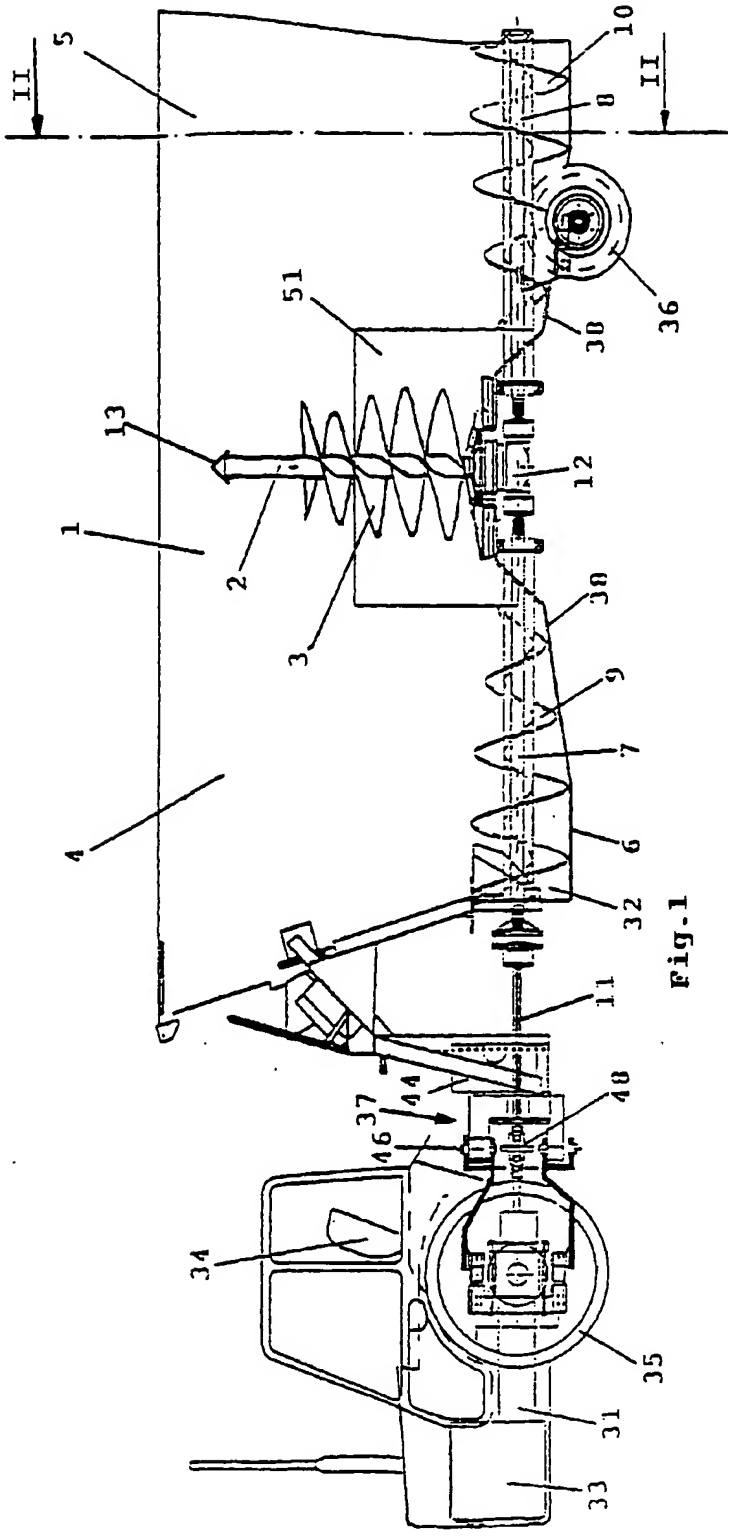

Fig.1

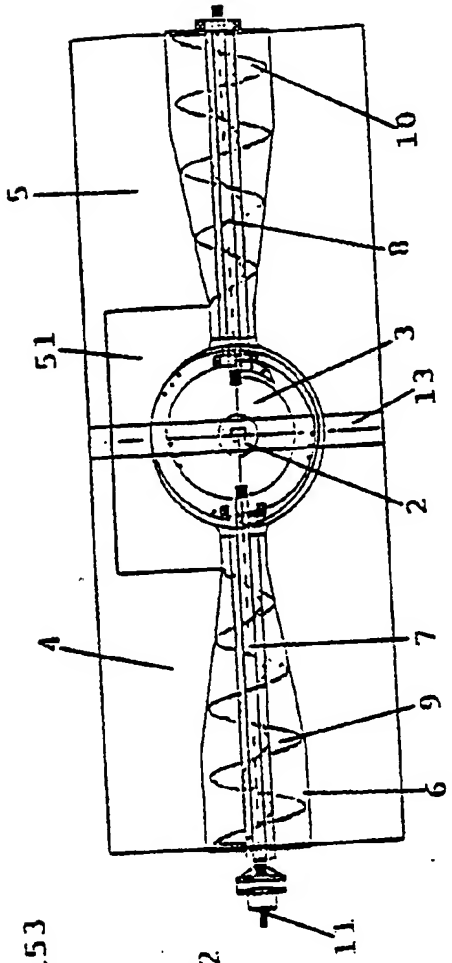

Fig.3

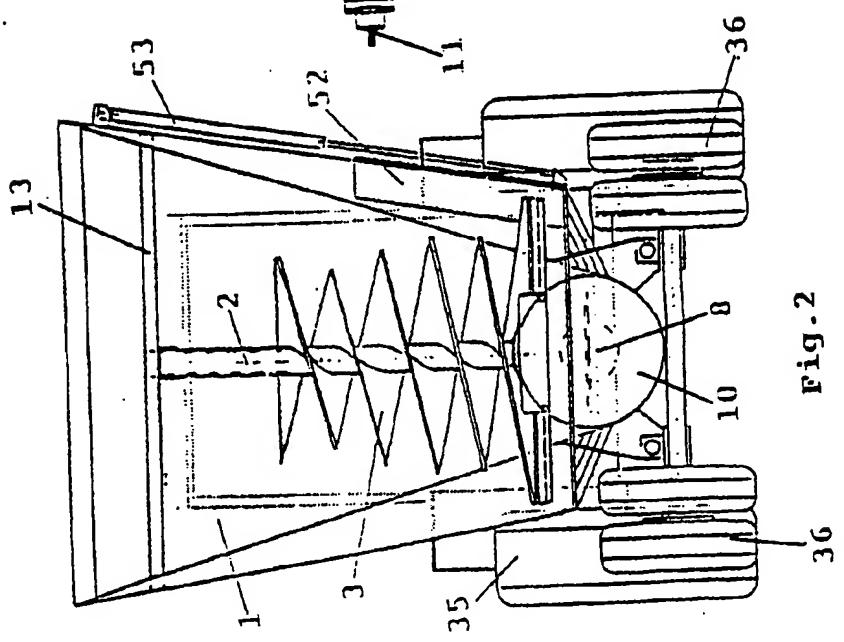

Fig.2

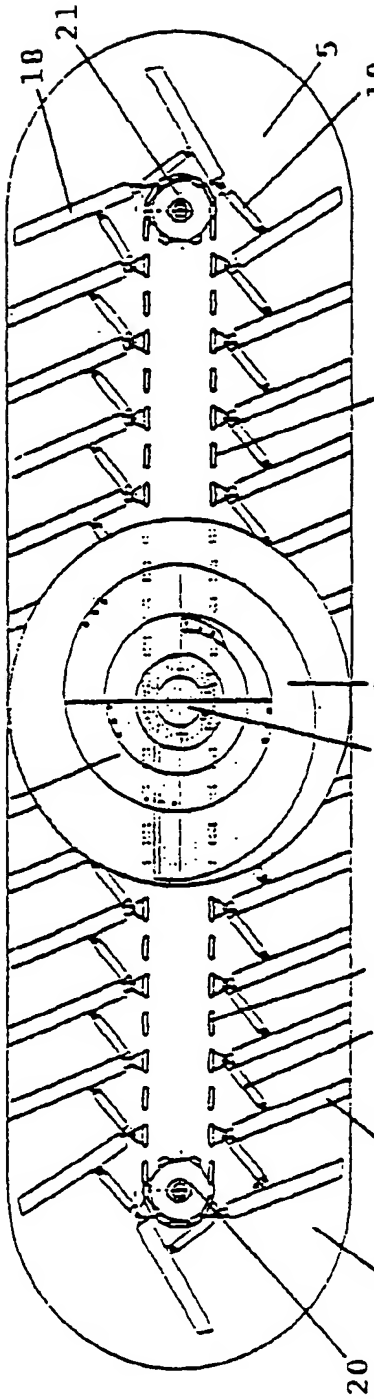

Fig.5

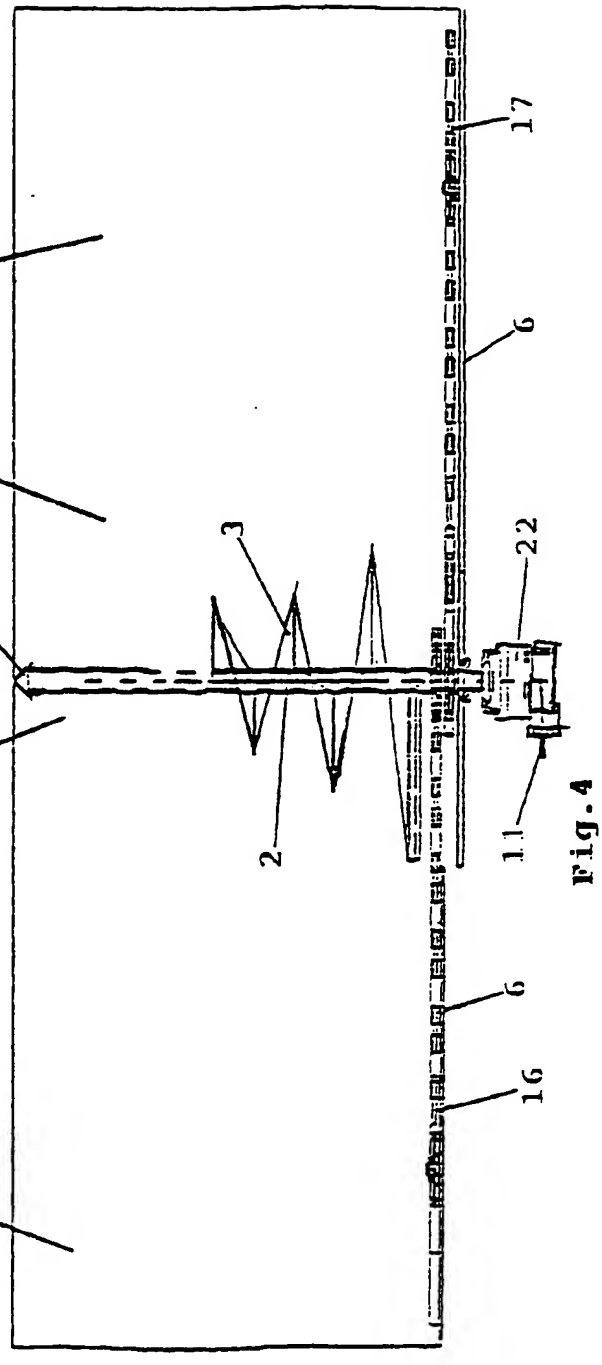

Fig.4

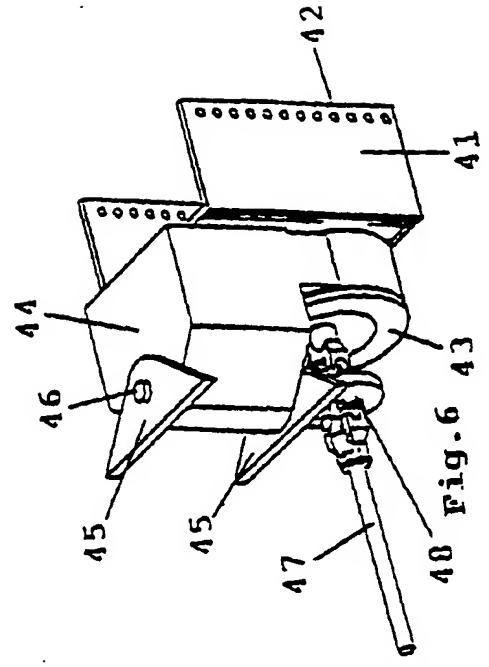

Fig.6

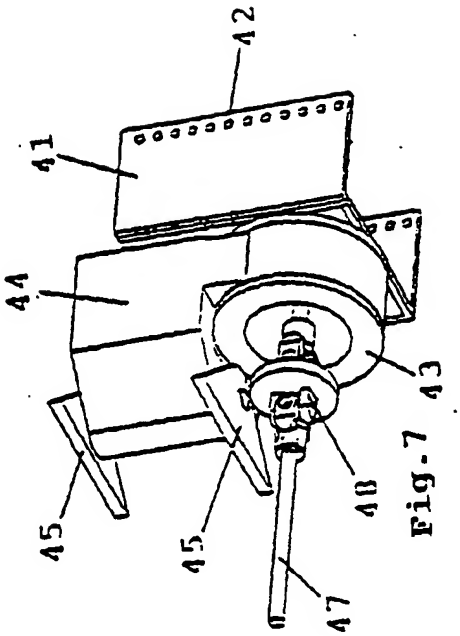

Fig.7

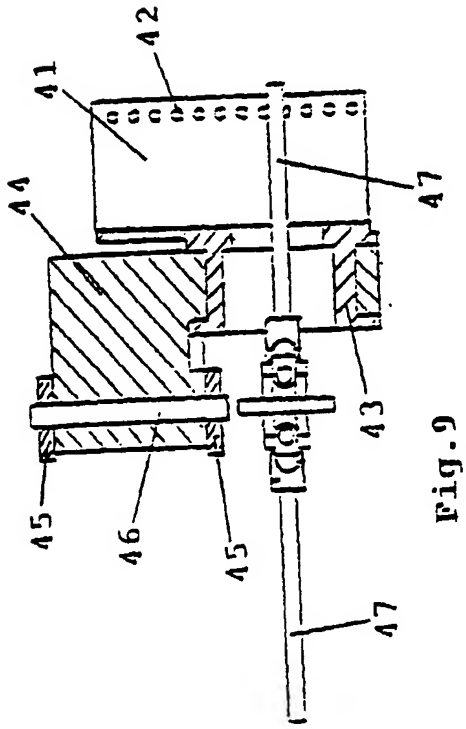

Fig.9

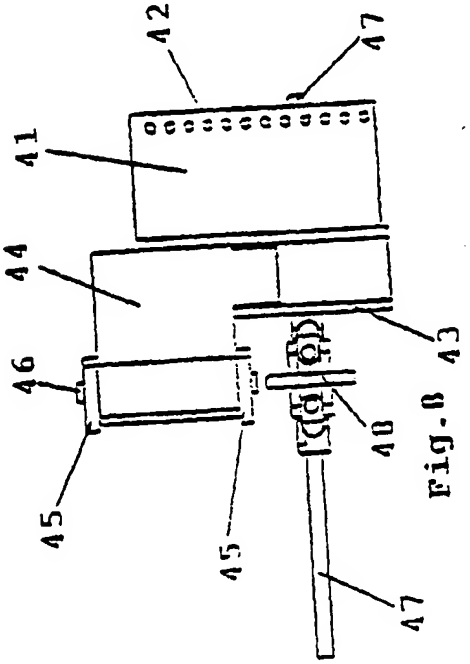

Fig.8

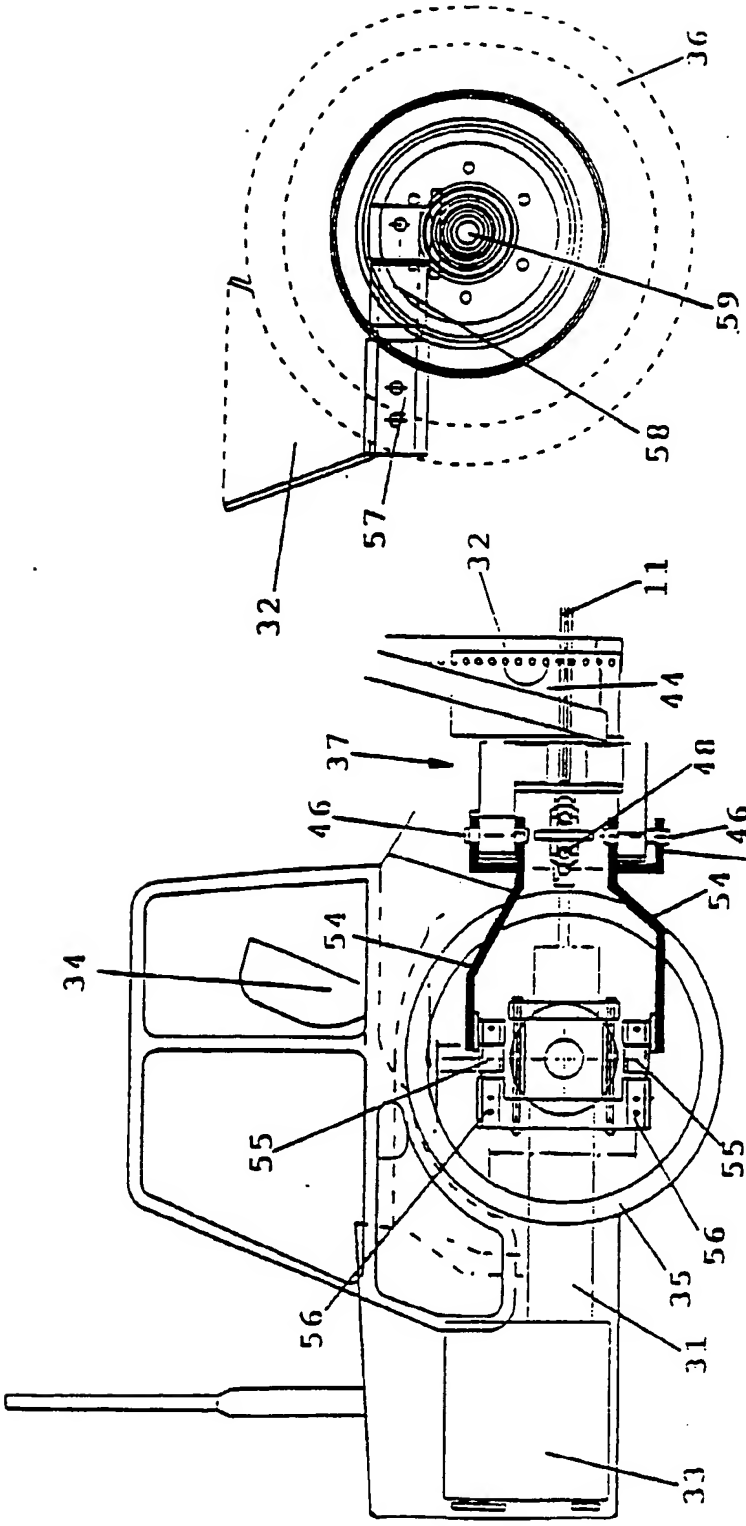

Fig.11

Fig.10